ELECTRIC AND MAGNETIC SIGNATURES OF STRUCTURAL AND CHEMICAL ORDERING OF HEUSLER ALLOY FILMS

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Heusler alloys have recently attracted a great attention due to martensitic transformations and half-metallic properties, respectively. Their properties heavily depend on chemical and structural ordering. Thin Heusler alloy films are ideal objects to trace various stages of ordering since they can be easily prepared in a highly disordered state (e.g., amorphous) and then they can be gradually ordered at elevated temperatures. The films were prepared by rf-sputtering or by flash-evaporation on substrates kept at ambient or at low temperature. Since the resistivity is affected by local disorder, the resistivity measurements were applied for indirect characterization of the order-disorder relations. We report the results on the temperature dependencies of resistivity and magnetization for some Heusler alloy films: Co_2CrAl, Co_2MnSi and off-stoichiometric $Ni_2Mn_{1+x}Sn_x$, $Ni_2Mn_{1-x}Ga_x$ that are known to exhibit half-metallic properties and martensitic transformations in bulk, respectively. From ρ vs. T characteristics we distinguish various stages of chemical/structural ordering in the films. They appear to be quite distinct in both systems investigated. The resistivity results are compared with magnetic characteristics for some films with high T_C.

9.7 cm

13.4 cm

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